

Scientific Note

**HEMIHYALEA EDWARDSII (PACKARD)
(LEPIDOPTERA: ARCTIIDAE) IS THE HOST OF
PARADEJEANIA RUTILIOIDES (JAENNICKE)
(DIPTERA: TACHINIDAE) IN
CENTRAL COASTAL CALIFORNIA**

Paradejeania rutilioides (Jaennicke) is a widespread species in the western Nearctic, including Mexico. West coast populations, which range from Vancouver Island to southern California, have more extensive black markings on the ochreous abdomen and were designated (Arnaud, P. 1951. *Canad. Entomol.*, 83: 332) as a subspecies, *nigrescens* Arnaud. In California, this race occurs along the coast and Coast Ranges from Humboldt to Monterey Counties, on the west slope of the Sierra Nevada, and in the Transverse and Peninsular Ranges, to elevations of 1900 m; nearly all collection records are from late August to November (Arnaud 1951; University of California, Berkeley, specimens).

Paradejeania rutilioides nigrescens is the largest and most conspicuous tachinid in California, yet its biology is poorly known. General and perhaps presumed host records date back to the early 1900s (Essig, E. O. 1913. *Injurious and beneficial insects of California*. Calif. State Comm. Hort. Mo. Bull. 2: 261; 1915, *ibid*, 2nd ed. Suppl. 4: 330), when *Paradejeania* was stated to feed on “caterpillars” and “caterpillars of various species,” respectively, without specific taxa given.

Arnaud reported a host of this fly to be an arctiid, *Hemihyalea* sp., based on a specimen from Los Gatos, Santa Clara Co., California, reared by H. P. Allmendiger and R. Maddux (Arnaud, P. 1974. *Pan-Pacif. Entomol.*, 50: 93). Because there is only one species of *Hemihyalea* known in the area, *H. edwardsii* (Packard), this is presumably Arnaud’s host record. The following observations on a rearing lot that produced three examples of the fly and one of the moth agree with this assumption. The only other reared specimen of *P. r. nigrescens* that we have seen is one that emerged from leaf litter collected beneath *Quercus agrifolia* Neé in Golden Gate Park, San Francisco, by P. A. Opler (JAP 67G16). The duff was procured 21 Jul 1967, evidently containing a puparium, and the fly eclosed 6 Sep 1967 (UCB).

During a Lepidoptera survey trip to Big Creek Reserve in coastal Monterey Co., California, 5 Jun 1990, we noticed several large woollybears climbing the main trunk of a mature *Q. agrifolia* at dusk. Six were collected from heights of 2.4 to 3.0 m and others could be seen further up. There was a large tree hole in this trunk that contained arctiid exuvia and copious frass. Apparently, the *Hemihyalea* larvae migrate up to the foliage to feed at night and retreat to a shelter during the day. This explains why we have never found larvae of this arctiid on *Q. agrifolia* during diurnal survey for lepidopterous larvae at numerous localities in the region. We also found one larva of *H. edwardsii* at night on *Q. agrifolia* at a higher elevation site at Big Creek in April (JAP 90D64).

The six larvae collected in June were transported to Berkeley for rearing. Five produced cocoons; one larva died prior to, and one following cocoon construction. A large tachinid puparium appeared in each of three of the cocoons in late June and July after emergence of the maggots. Three specimens of *P. rutilioides nigrescens* emerged 12 Jul to 30 Aug and one *H. edwardsii* on 17 Sep.

It is clear that *Hemihylea* serves as a host for *Paradejeania*, and the coincidental autumnal flight periods of the two insects suggest that this moth is the only host in this region, because we do not have any other large fall-flying, univoltine moth in the coastal areas inhabited by *P. rutilioides*. Although we still do not know how this tachinid infects its host, some observations provide clues for a possible answer. Arnaud observed females of this fly that bore dozens of active maggots in utero, in December, 1966, in San Francisco at the same site where Opler's *Paradejeania* was reared the following September (Arnaud, P. 1968. Pan-Pacif. Entomol., 44: 85). This suggests that this tachinid, at least the females, can survive for a long time, into mid-winter when *H. edwardsii* presumably has entered early larval stages. Considering that the tachinid is larviparous and diurnal and the arctiid larvae are nocturnal, it seems difficult to explain the high parasitism rate of larvae we encountered. *Hemihylea* larvae likely are widely dispersed during feeding in the expansive canopy of *Q. agrifolia*. The female tachinid produces hundreds, or even thousands, of larvae and the first instars may be distributed generally on the foliage, where they would have to be capable of surviving until arrival of the host caterpillars. Alternatively, *P. rutilioides* may be able to locate resting groups of larvae and larviposit at the retreat either near, or on, the arctiid larvae.

The moths are abundant in late September and October, often 20–30 per black-light trap sample, with a few worn examples persisting into November. The conspicuous fly visits flowers of *Eriogonum*, *Haplopappus*, *Aster*, etc. (numerous on introduced ivy, *Hedera*, growing at the Gatehouse), in late October and November. None was observed during late September and early October when adults of the arctiid are most numerous.

Records.—All the following data are from: CALIFORNIA. MONTEREY Co.: Big Creek Reserve: *H. edwardsii*: HQ area 0–10 m, coastal scrub, 3–4 Oct 1985, 27–28 Sep 1987, 29 Oct 1989, J. W. Brown, J. A. Powell; Gatehouse, 18 Oct 1988, J. Smiley; Trail to Redwood Camp 80 m, 27 Sep 1987, J. A. Powell; Devils Creek Flat 120 m, 27 Sep 1987, J. W. Brown; South Ridge Rd, 220 m, 7 Nov 1988, 29–30 Oct 1989, and larvae 5 Jun 1990, r.f. *Quercus agrifolia*, emgd. 17 Sep 1990 (JAP 90F12) Y.-F. Hsu, J. A. Powell; South Ridge Rd, 450–500 m, 29–30 Oct 1989; South Highlands, 675 m, larva 27 Apr 1990, r.f. *Q. agrifolia*, emgd. 12 Sep 1990 (JAP 90D64) Y.-F. Hsu.

P. rutilioides nigrescens: HQ area 0–10 m, coastal scrub, 30 Oct 1989; grassland above Brunette Crk, 180–240 m, 31 Oct 1989, J. A. Powell; South Ridge Rd, 220 m, 5 Jun 1990, r.f. *Hemihylea edwardsii* larvae, emgd. 12 Jul, 20, 31 Aug 1990 (JAP 90F12) Y.-F. Hsu, J. A. Powell; South Highlands, 625–750 m, 30 Oct 1989; vic. French Camp, 750–800 m, manzanita-pine-oak woods, 6–8 Nov 1989, J. A. Powell.

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